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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,367	07/17/2003	Kiyoshi Maeshima	67161-067	9719

7590 05/20/2005

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600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER

MOHAMEDULLA, SALEHA R

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 05/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/620,367

Applicant(s)

MAESHIMA, KIYOSHI

Examiner

Saleha R. Mohamedulla

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>7/03, 5/04, 3/04, 4/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-5 are pending.

Information Disclosure Statement

1. References crossed out in the IDS submitted May 26, 2004 are duplicates of references listed and considered in the IDS submitted March 9, 2004.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by US# 5,935,736 to Tzu.
3. Tzu teaches a mask that eliminates side lobe effects. A first pattern is formed in a layer of attenuating phase shifting material and a second pattern is formed in an opaque layer on the phase shifting material such that the pattern edges of the first pattern are exposed (Abstract). Figure 5 shows a top view of the mask and Figure 6 shows a cross section view of the mask. The mask is used to form via holes or parallel lines (col. 3, lines 20-35). Therefore, Tzu teaches a plurality of transmission regions 48, a half-tone region 42 and a light shielding region 46. The transmission regions are surrounded by the half-tone regions. The light shielding region 46 is positioned between adjacent transmission regions. Tzu teaches this mask aids in exposure when

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line dimensions decrease into the 0.30 to 0.35 micrometer range (col. 1, lines 42-47 and col. 2, lines 14-22). Therefore, Tzu teaches the transmission regions are arranged at a pitch of 0.32 microns. Tzu also teaches making an electrical device (col. 3, lines 20-40).

4. Tzu also teaches making the mask in Figures 8A to 10. An opaque layer is deposited on an attenuating layer which is deposited on a transparent substrate (col. 4, lines 40-48). A resist is then deposited and patterned. The opaque material is then patterned and a second resist is deposited and used to pattern the attenuating layer (col. 4, line 55 – col. 5, line 5). The second resist material is then stripped.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over US# 5,700,606 to Kobayashi in view of US# 5,935,736 to Tzu.

7. Kobayashi teaches a mask with a transparent substrate, an attenuating material and an opaque layer. Figure 2 shows a photomask where contact hole patterns are arranged. The light shielding film 3 is formed so that each opening thereof surrounds each aperture section with a constant distance from the aperture section 1. Figures 2(a) and 2(b) also shows the half-tone material 2. Therefore, Kobayashi teaches a plurality of transmission regions 1, a half-tone region 2 and a light shielding region 3. The transmission regions are surrounded by the half-tone

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regions. The light shielding region 3 is positioned between adjacent transmission regions.

Kobayashi also teaches that the mask prevents unwanted patterns due to a sidelobe of a contact hole as the pattern pitch of the patterns increases (col. 6, lines 5-10).

8. Kobayashi also teaches manufacturing the mask in Figure 1. A resist is deposited on an opaque layer deposited on a half-tone material which is deposited on a transparent substrate (col. 7, lines 30-35). The dosage of the exposure is adjusted during the exposure process so that area A remains in an unexposed portion and area B has a remaining resist whose thickness is half that of area A. Therefore, Kobayashi teaches shrinking the resist, as shown in Figure 1(b) (col. 8, lines 10-35). A partial surface of the light shielding film is exposed. The light shielding and half tone films are subjected to etching processes (col. 8, lines 45-65; Figures 1(c)-1(g)).

9. Kobayashi does not teach a pitch of 0.32 microns or that a line and space pattern may be formed. Tzu teaches a mask that aids in exposure when line dimensions decrease into the 0.30 to 0.35 micrometer range (col. 1, lines 42-47 and col. 2, lines 14-22). Therefore, Tzu teaches the transmission regions are arranged at a pitch of 0.32 microns. Tzu also teaches the mask can be used to form contact holes or parallel lines (col. 3, lines 20-35).

10. The references are analogous art as they are drawn to attenuating masks. It would have been obvious to one of ordinary skill in the art to use the pitch of Tzu in Kobayashi as the pitch is used to prevent unwanted patterns due to sidelobe effects (Tzu; col. 2, lines 10-45).

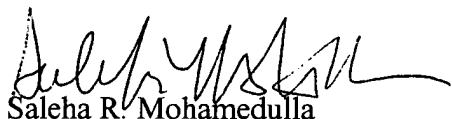
Conclusion

11. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Saleha Mohamedulla whose telephone number is (571) 272-

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1387. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Saleha R. Mohamedulla
Patent Examiner
Technology Center 1700
May 14, 2005